

Water-dispersible radiation-curable polyurethanes

Patent Number: EP0872502
Publication date: 1998-10-21
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Requested Patent: ☐ EP0872502, A1, A1, B1
Application: EP19980104967 19980319
Priority Number(s): DE19971015382 19970414
IPC Classification: C08G18/68; C08G18/08; C08G18/65; C09D175/14
EC Classification: C09D175/16, C08G18/67B4, C08G18/67B4D,
Equivalents: ☐ DE19715382, ☐ ES2121724T
Cited Documents: EP0753531; EP0590889; US4874799

Abstract

Water-dispersed, radiation-curable polyurethanes (PUR) (I), derived from (meth)acrylated polyester- and/or polyetherester- polyols (II) obtained by (A) condensation of a mixture containing (a) 15-65 wt.% (cyclo) aliphatic diols with a molecular weight of 40-1000, (b) 15-65 wt.% (cyclo)aliphatic and/or aromatic 3-20C dicarboxylic acids or anhydrides, (c) 15-65 wt.% at least trihydric 3-40C polyols and/or alkoxyated derivatives thereof, and (d) 15-35 wt.% (meth)acrylic acid, to give (meth)acrylated polyols (A) with hydroxyl numbers of 140-250 mg KOH/g and acid numbers of 0-15 mg KOH/g, followed by (B) further reaction in a mixture (B) containing (e) 20-40 wt.% (A), (f) 10-30 wt.% of an addition product of epsilon -caprolactone (ECL) with (2-4C hydroxy-alkyl) (meth)acrylate and/or an alkoxyated derivative thereof with a 2-18C alkyl group, (g) 5-10 wt.% 5-9C 2,2-bis-(hydroxymethyl)- alkanolic acid of formula HO-CH₂-C(R)(COOH)-CH₂-OH (III) (in which R = 1-5C alkyl) and/or salts thereof obtained by neutralisation with organic amines and/or ammonia, and (h) 35-55 wt.% di- and/or poly-isocyanate, followed by (C) dispersion of the resulting prepolymer in 50-61 wt.% water and (D) chain-extension with 0.5-3 wt.% mono-, di- and/or polyamine (based on prepolymer from B). Also claimed is a process for the production of (I).

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